

**IN THE CLAIMS:**

Please cancel claim 36 without prejudice.

- 1 1. (Currently Amended) A method for a file server to allocate a spare disk to replace a  
2 failed disk in a network storage system comprising the steps of:  
3 identifying a set of spare disks, the set of spare disks attached to a plurality of fil-  
4 ers of the network storage system;  
5 choosing a best spare disk of the set of spare disks the best spare disk attached to  
6 any of the filers of the plurality of filers; and  
7 claiming ownership of the best spare disk.
- 1 2. (Original) The method of claim 1 further comprising the steps of:  
2 choosing, in response to a failure of the step of claiming ownership, a next best  
3 spare disk of the spare disks available; and  
4 claiming ownership of the next best spare disk.
- 1 3. (Original) The method of claim 2, wherein the step of claiming ownership of the best  
2 spare disk further comprises the steps of:  
3 setting a first ownership attribute to a file server-owned state; and  
4 setting a second ownership attribute to a file server-owned state.

1 4.(Original) The method of claim 1 wherein the step of choosing the best spare disk fur-  
2 ther comprises the steps of:

3 selecting one or more disks from the set of spare disks that satisfy one or more  
4 rules;

5 sorting the one or more disks selected from the set of spare disks according to a  
6 set of ordered policies to identify a highest-ranked disk;

7 choosing a highest-ranked disk as the best spare disk; and

8 choosing, in response to more than one of the one or more disks being highest-  
9 ranked, one disk at random, from the more than one of the one or more disks that are  
10 highest-ranked, as the best spare disk.

1 5. (Original) A method of verifying that a plurality of disks in a volume are optimally  
2 configured comprising the steps of:

3 identifying all of the disks in the volume;

4 obtaining disk characteristics, respectfully, from all of the disks in the volume;

5 comparing the disk characteristics with a set of policies and characteristics of  
6 spare disks; and

7 alerting an administrator if a more optimal configuration is possible.

1 6. (Original) The method of claim 5 further comprising the step of:

2 reconfiguring the disks into a more optimal configuration.

1 7. (Currently Amended) A method of selecting a best spare disk for use by a file  
2 ~~server~~filer in a network storage system including a plurality of filers, and serving an array  
3 of disks from a set of spare disks comprising the steps of:  
4 selecting one or more disks from the set of spare disks attached to any of the filers  
5 of the plurality of filers, said set of disks satisfying~~that satisfy~~ one or more rules;  
6 sorting the one or more disks using a set of ordered policies;  
7 if only one disk is highest-ranked, selecting the one disk that is highest-ranked as  
8 the best spare disk; and  
9 if a plurality of disks are highest-ranked, selecting one of the disks from the plu-  
10 rality of disks that are highest-ranked as the best spare disk.

1 8. (Currently Amended) A network storage system comprising:  
2 one or more switches;  
3 a plurality of spare disks operatively interconnected through at least one of the  
4 switches; and  
5 one or more file servers operatively interconnected to at least one of the switches,  
6 each of the file servers including means for allocating one of the plurality of spare disks  
7 to any of the servers.

1 9. (Original) The network storage system of claim 8, wherein the means for allocat-  
2 ing one or more of the plurality of spare disks further comprises:  
3 means for identifying the plurality of spare disks;

4 means for selecting a best spare disk from the plurality of spare disks; and

5 means for claiming ownership of the best spare disk.

1 10. (Original) The network storage system of claim 9, wherein the means for selecting a  
2 best spare disk from the plurality of spare disks further comprises:

3 means for selecting a set of disks from the plurality of spare disks that satisfy one or  
4 more rules;

5 means for sorting the set of disks according to a set of ordered policies; and

6 means for selecting a highest-ranked disk from the set of disks.

1 11. (Currently Amended) A computer-readable medium, including program instruc-  
2 tions executing on a ~~file-server~~filer, for allocating a replacement disk to the ~~file-server~~  
3 filer, the program instructions performing the steps of:

4 identifying a set of spare disks the set of spare disks attached to a plurality of fil-  
5 ers of the network storage system;

6 choosing a best spare disk of the set of spare disks the best spare disk attached to  
7 any of the plurality of filers; and

8 claiming ownership of the best spare disk.

1 12. (Original) The computer-readable medium of claim 11, wherein the step of choosing  
2 the best spare disk further comprises the steps of:

3           selecting one or more disks from a set of spare disks that satisfy one or more  
4 rules;  
5           sorting the one or more disks selected from the set of spare disks according to a  
6 set of ordered policies to identify a highest-ranked disk;  
7           choosing a highest-ranked disk as the best spare disk; and  
8           choosing, in response to more than one of the one or more disks being highest-  
9 ranked, one disk at random, from the more than one of the one or more disks that are  
10 highest-ranked, as the best spare disk.

1   13. (Previously Presented) A method for allocating a spare disk to replace a failed disk  
2 in a network storage system, comprising:

3           maintaining a plurality of volumes in the network storage system, each volume  
4 associated with a set of disk storage units;  
5           maintaining a plurality of spare disks in the network storage system;  
6           choosing a best spare disk of the plurality of spare disks to replace a failed disk,  
7 the failed disk associated with any volume of the network storage system; and  
8           replacing the failed disk with the best spare disk.

1   14. (Previously Presented) The method as in claim 13, further comprising:  
2           establishing at least one file server in the network storage system; and  
3           performing the step of choosing a best spare disk by the at least one file server.

1 15. (Previously Presented) The method as in claim 13, further comprising:  
2 establishing at least one file server in the network storage system; and  
3 performing the step of replacing the failed disk with the best spare disk by the file  
4 server.

1 16. (Previously Presented) The method as in claim 13, further comprising:  
2 determining the best spare disk by selecting those disks from the plurality of spare  
3 disks which meet at least one selected rule.

1 17. (Previously Presented) The method as in claim 13, further comprising:  
2 sorting disks in accordance with policies, and assigning a score to each disk as a  
3 result of the sorting; and  
4 selecting the disk with a highest score as the best spare disk.

1 18. (Previously Presented) The method as in claim 13, further comprising:  
2 determining those disks of the plurality of spare disks which meet at least one se-  
3 lected rule to form a selected pool of disks;  
4 sorting disks of the selected pool of disks in accordance with policies, and assign-  
5 ing a score to each disk as a result of the sorting; and  
6 selecting the disk with a highest score as the best spare disk.

1 19. (Previously Presented) The method as in claim 13, further comprising:

2           using a random selection process to select the best spare disk in the event that two  
3           or more disks appear to be equally the best spare disk.

1   20. (Previously Presented) A method for allocating a spare disk to replace a failed disk in  
2   a network storage system, comprising:

3           maintaining a plurality of volumes in the network storage system, each volume  
4   associated with a set of disk storage units;

5           maintaining a plurality of spare disks in the network storage system;

6           attempting to determine the best spare disk by selecting those disks from the plu-  
7   rality of spare disks which meet at least one rule;

8           replacing the failed disk with the best spare disk;

9           in the event that no spare disk meets the at least one rule, selecting a spare disk  
10   which violates the at least one rule as a selected disk; and

11          notifying an administrator that the selected spare disk violates the rule.

1   21. (Previously Presented) A network storage system, comprising:

2           means for maintaining a plurality of volumes in the network storage system, each  
3   volume associated with a set of disk storage units;

4           means for maintaining a plurality of spare disks in the network storage system;

5           means for choosing a best spare disk of the plurality of spare disks to replace a  
6   failed disk, the failed disk associated with any volume of the network storage system; and

7           means for replacing the failed disk with the best spare disk.

1 22. (Previously Presented) The network storage system of claim 21, further comprising:  
2 means for establishing at least one file server in the network storage system; and  
3 means for performing the step of choosing a best spare disk by the at least one file  
4 server.

1 23. (Previously Presented) The network storage system of claim 21, further comprising:  
2 means for establishing at least one file server in the network storage system; and  
3 means for performing the step of replacing the failed disk with the best spare disk  
4 by the file server.

1 24. (Previously Presented) The network storage system of claim 21, further comprising:  
2 means for determining the best spare disk by selecting those disks from the plural-  
3 ity of spare disks which meet at least one selected rule.

1 25. (Previously Presented) The network storage system of claim 21, further comprising:  
2 means for sorting disks in accordance with policies, and assigning a score to each  
3 disk as a result of the sorting; and  
4 means for selecting the disk with a highest score as the best spare disk.

1 26. (Previously Presented) The network storage system of claim 21, further comprising:



2 means for determining those disks of the plurality of spare disks which meet at  
3 least one selected rule to form a selected pool of disks;

4 means for sorting disks of the selected pool of disks in accordance with policies,  
5 and assigning a score to each disk as a result of the sorting; and

6 means for selecting the disk with a highest score as the best spare disk.

1 27. (Previously Presented) The network storage system of claim 21, further comprising:

2 means for using a random selection process to select the best spare disk in the  
3 event that two or more disks appear to be equally the best spare disk.

1 28. (Previously Presented) A network storage system, comprising:

2 means for maintaining a plurality of volumes in the network storage system, each  
3 volume associated with a set of disk storage units;

4 means for maintaining a plurality of spare disks in the network storage system;

5 means for attempting to determine a best spare disk by selecting those disks from  
6 the plurality of spare disks which meet at least one rule;

7 means for replacing the failed disk with the best spare disk;

1 in the event that no spare disk meets the at least one rule, means for selecting a  
2 spare disk which violates the at least one rule as a selected disk; and

3 means for notifying an administrator that the selected spare disk violates the rule.

1 29. (Previously Presented) A file server in a network storage system, comprising:

2 a storage adapter to connect to a plurality of disk storage units in the network

3 storage system;

4 an operating system to maintain a plurality of volumes, each volume associated

5 with a set of disk storage units, the set of disk storage units selected from the plurality of

6 disk storage units;

7 the operating system maintaining a plurality of spare disks units selected from the

8 plurality of disk storage units;

9 the operating system choosing a best spare disk of the plurality of spare disks to

10 replace a failed disk, the failed disk associated with any volume of the network storage

11 system; and

12 the operating system replacing the failed disk with the best spare disk.

1 30. (Previously Presented) The file server of claim 29, further comprising:

2 the operating system determining the best spare disk by selecting those disks from

3 the plurality of spare disks which meet at least one selected rule.

1 31. (Previously Presented) The file server system of claim 29, further comprising:

2 the operating system sorting disks in accordance with policies, and assigning a

3 score to each disk as a result of the sorting; and

4 the operating system selecting the disk with a highest score as the best spare disk.

1 32. (Previously Presented) The file server system of claim 29, further comprising:

2           the operating system determining those disks of the plurality of spare disks which  
3   meet at least one selected rule to form a selected pool of disks;  
4           the operating system sorting disks of the selected pool of disks in accordance with  
5   policies, and assigning a score to each disk as a result of the sorting;  
6           the operating system selecting the disk with a highest score as the best spare disk.

1   33. (Previously Presented) The file server of claim 29, further comprising:

2           the operating system using a random selection process to select the best spare disk  
3   in the event that two or more disks appear to be equally the best spare disk.

1   34. (Previously Presented) A file server in a network storage system, comprising:

2           a storage adapter to connect to a plurality of disk storage units in the network  
3   storage system;

4           an operating system to maintain a plurality of volumes, each volume associated  
5   with a set of disk storage units, the set of disk storage units selected from the plurality of  
6   disk storage units;

7           the operating system maintaining a plurality of spare disks units selected from the  
8   plurality of disk storage units;

9           the operating system choosing a best spare disk of the plurality of spare disks to  
10   replace a failed disk, the failed disk associated with any volume of the network storage  
11   system;

12           the operating system attempting to determine a best spare disk by selecting those  
13 disks from the plurality of spare disks which meet at least one rule;  
14           the operating system replacing the failed disk with the best spare disk;  
15           in the event that no spare disk meets the at least one rule, the operating system se-  
16 lecting a spare disk which violates the at least one rule as a selected disk; and  
17           the operating system notifying an administrator that the selected spare disk vio-  
18 lates the rule.

1   35. (Previously Presented) A computer readable media, comprising:  
2           said computer readable media containing instructions for execution on a processor  
3 for the practice of a method for allocating a spare disk to replace a failed disk in a net-  
4 work storage system, the method having the steps of,  
5           maintaining a plurality of volumes in the network storage system, each volume  
6 associated with a set of disk storage units;  
7           maintaining a plurality of spare disks in the network storage system;  
8           choosing a best spare disk of the plurality of spare disks to replace a failed disk,  
9 the failed disk associated with any volume of the network storage system; and  
10          replacing the failed disk with the best spare disk.

1   36. (Cancelled)